MANEUVER ANALYSIS OF THE CASSINI MISSION

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ABSTRACT

Maneuver analysis required to navigate the Cassini spacecraft orbiter/probe mission to Saturn is presented. First the navigation requirement and the resulting propellant budget are given. Then the possible trajectories are introduced and the general strategy is outlined. Detailed results are presented for the prime trajectory, which is a Launch-Venus-Venus-Earth-Jupiter Gravity Assist trajectory launched in October of 1997 (97 VVEJGA). The three phases of the mission; interplanetary cruise, first Saturn orbit, and tour are presented in order. Trajectory and targeting adjustments have been made to reduce the probability of Earth impact due to any cause including spacecraft failure. This avoids any possibility of contamination from the plutonium based electrical power source used. Careful contingency plans have been made to ensure insertion into the desired orbit around Saturn, since missing this crucial maneuver by a matter of hours can cause the mission to be lost. Finally, the secondary and backup interplanetary trajectories are presented, with a summary of results for each.